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LEPROSY:

SUMMARY OF RECENT WORK.

No. 2.

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LEPROSY.

Hasseltine (H. E.). **Studies upon Leprosy. XXXIV. Further Statistics of Leprosy in Hawaii.**—*U.S. Public Health Service. Treasury Dept. Public Health Bull. No. 130.* 1922. Dec. pp. 1–11.

This paper continues the records of *Public Health Bulletins* Nos. 33 and 66 from 1913 to 1921 inclusive, the numbers of admissions in the last year being double that of 1913, owing to a number of lepers having recently surrendered voluntarily to obtain the improved treatment—a most satisfactory feature. In spite of this the average annual incidence per 1,000 population has fallen from 0·45 for the decade 1902 to 1911 to only 0·33 per mille during the last ten years, showing that the incidence is gradually lessening. The table of the ages of the lepers shows that 40 per cent. entered segregation before reaching the age of 21, and another 36 per cent. between the ages of 21 and 36, leaving only 24 per cent. in the latter half of life. Association with lepers before segregation was admitted in 48 per cent. of the 665 cases, the most frequently infected relatives in order of frequency being brother or sister 110, father or mother 67, uncle or aunt 56, cousin 28, friend 26, grandparent 19, and son or daughter 13. The duration of the disease before segregation was within one year in 193 of the 665 cases, or nearly one-third, within two years in 311, or nearly one-half, so that over one-half the cases had over two years in which to infect others before they were segregated ; this, it is pointed out, is due to hiding of cases, which " has done much to reduce the power of segregation in the prevention of the disease." Since the introduction of injections of soluble preparations of chaulmoogra oil in the treatment it has been found that early cases yield to treatment more rapidly than those of long standing, and when this becomes generally known " it may be predicted that a reduction in the incidence of leprosy greater than ever seen in these islands will become evident." Since a number of recovered cases have been discharged on parole the proportion of lepers coming within the first two years of the onset of the disease has risen materially, and one released man brought his daughter in an early nodular stage, six weeks' treatment of whom removed the nodules and the bacilli.

L. Rogers.

Hasseltine (H. E.). **Studies upon Leprosy. XXXV. Statistical Report on Cases of Leprosy which have left Segregation on Parole.**—*U.S. Public Health Service. Treasury Dept. Public Health Bull. No. 130.* 1922. Dec. pp. 12–24. [12 refs.]

This report on the results of paroling apparently cured or non-infective lepers is of great interest. Since 1912 up to the end of 1921 249 were released, but the average number set free annually up to 1918 was only 11, while during the last three years, as a result of the improved treatment, the average discharges were 57. Europeans had a slightly higher discharge rate then other races ; approximately 30 per cent. of those entering segregation have been paroled. The paroled include more females than males in proportion to their numbers, while the percentage decreased with the rise of age from the lowest ages up to 26 to 30 years, after which there is a slight increase owing to the number of chronic nerve cases long in residence, so that the younger lepers have the more favourable outlook. The duration of the disease on first being segregated has a considerable influence, 33 per cent. of those of under one year's duration and 25 per cent. under two years, 21 to 24 per cent. of those of from 2 to 5 years' duration having been paroled, against 11 to 13 per cent. of between 5 and 7 years' duration. Longer cases, who represent the survival of the fittest, which include many chronic nerve ones, in which the infection has died out leaving the patients much crippled, again show higher rates of release. The percentage of recurrences was also lowest in those who had been affected less than a year on admission, again showing the better prognosis in early cases, leading the author to conclude that " the early recognition and treatment of leprosy is the point on which most emphasis should be placed." Thus of those affected less than a year 1 in 3 was paroled, in 1 to 2 year old cases 1 in 4, in 3 to 4 year cases 2 in 9, in 4 to 5 year cases 1 in 5 and of those having the disease 5 to 6 years only 1 in 10 was released as having become uninfective.

The duration of treatment table shows that nearly 70 per cent. of the paroled were in segregation less than two years and about 10 per cent. over 10 years, while of 168 paroled cases treated less than two years 17 per cent. relapsed, and of 74 treated over two years 14 relapsed. With regard to the type 73 out of 143 anaesthetic, 108 out of 382 nodular, and 30 out 119 mixed cases were paroled, so in proportion to the admissions more nerve than nodular ones were released, the nerve form being generally recognized as the mildest and least fatal. It is significant that in the earlier years no nodular cases were paroled, but with the improved treatment they are clearing up in numbers. On admission 157 of the cases were bacteriologically positive ; these had all become negative before release. Experience has shown that recently " the requirements for parole became less rigid and possibly too lenient," but much good has been done by thus teaching the public " that the disease is amenable to treatment and that the life in segregation is far better than the usually gloomy picture so often painted in books and magazine articles. This has caused a considerable number of lepers to surrender themselves and receive treatment, thereby removing dangerous cases from the community." Repeated bacteriological examinations will be made before release in future, when it is hoped relapses will be less frequent.

L. R.

NEW SOUTH WALES : Leper Lazaret. **Thirty-Second Report on Leprosy in New South Wales, for the Year ended 31st December, 1922.** [MILLARD (R. J.), Med. Supt.]—*Report of the Director-General of Public Health New South Wales for the Year 1922.* pp. 94–101. (1923. Sydney : Alfred James Kent, Govt. Printer.)

On 1st January 1922 there remained 22, there were 3 admissions, including one escaped leper from the Queensland Lazaret, 2 died and 2 were discharged, one as recovered after treatment with sodium morrhuate and chaulmoogric esters, and one returned to Queensland; 21 remained at the end of the year. The usual tables and details of the cases are given with dates of admission, but no record of the duration of the disease. Chaulmoogra oil and hydnocarpates internally, sodium morrhuate injections during the first half of the year, oscol stibium and for the last two months E.C.C.O. treatment have been given, but no opinion of their value is recorded, the notes showing very little improvement in most of the cases. Half of the patients had been segregated 10 or more years, and three-fourths 5 or more, so the duration of their disease must have been considerably longer.

L. R.

Bourgin, Decrop & Salle. **Endémie et prophylaxie de la lèpre au Maroc.**—*Congrès de la Santé Publique et de la Prévoyance Sociale Marseille, 11–17 Septembre, 1922. Comptes Rendus.* pp. 137–142.

Leprosy is widespread in Morocco, 7 nodular, 16 nerve and 13 mixed cases having been seen in Fez during 1920. In the middle ages the disease was epidemic. Its contagiousness is undeniably through intimate contact leading to inoculation of abrasions of the skin, slight unrecognized cases being sometimes sources of infection, while some persons appear to be immune, as in the case of a woman who had 23 leper lovers, but escaped the disease. The authors advise leprosaria for town lepers, for the more contagious nodular cases and those discharging the bacilli from their noses; and in the villages compulsory notification, the prohibition of certain trades and the creation of institutions for looking after the infirm and recalcitrant lepers.

L. R.

Nigeria: Medical Research Institute. **Report on the Lepers at Yaba Asylum after Six Months' Treatment by the Method Suggested by Harper** [by Young (W. A.), Assistant Bacteriologist].—*Ann. Rep. on the Med. Research Inst. for the Year 1922.* pp. 36–38. (1923. Lagos: Govt. Printer.)

This is a report on six months' treatment of the lepers at the Yaba Asylum by Harper's method of intravenous injections. Other methods were often objected to by the patients on account of the pain following intramuscular injections, including moogrol. They preferred the daily intravenous injection of 10 to 12 minim doses of moogrol 500, ether 500, and iodine 1 part, although it caused immediate strong coughing, and was followed by febrile and local reactions and leucocytosis. In some cases it was difficult to find sufficient veins to continue them for long, and in time the injections became more painful on this account; after three or four months all but one asked to return to the muscular injections. These in turn were objected to, and finally a mixture of moogrol, iodine to give a distinct brown colour, with chalk and water to make an emulsion, was given up to 10 drachms daily, a day or two's rest being given if they reacted. At the time of reporting all the cases were still positive bacteriologically, the ulcers were healing or had healed, and they felt better, while three had shown great improvement, but an early nerve case was unchanged. The results are considered encouraging, but longer time is necessary to allow of the value of this treatment being decided.

L. R.

British Guiana: [(a) **Report on Public Leper Asylum, Mahaica, E.C., Demerara.** (b) **Extracts from Dr. Frendo's Special Report on Moogrol Treatment, Leper Asylum.**] [Frendo (J. A.), Med. Supt.] —*Report of the Surgeon General, British Guiana, for the Year 1922.* pp. 28–32. (1924. Georgetown: "Argosy" Co., Ltd.)

There were 248 lepers in the asylum at Demerara on January 1st 1922, 96 admissions and re-admissions; 29, or 8·4 per cent., died, 39 were discharged or absconded and 276 remained at the end of the year. The average number of lepers was 277. Moogrol treatment was used. Only a few slight febrile reactions were observed; in several cases nodules broke down followed by healing, while ulcers may heal at the same time. No toxic symptoms were observed. Photos showed facial improvement following absorption of nodules, trophic ulcers also healed in some nerve cases, and discoloured anaesthetic patches disappeared with partial recovery of sensation in some, while in many cases muscular tone was improved. The conclusion is reached that improvement was noticed in several cases, but it is too early to say if it will prove permanent. Apparently moogrol is the most hopeful drug and its use should be continued.

L. R.

de Almeida (Ribeiro). **A'Margem do Problema da Lepra.**—*Sciencia Medica.* Rio de Janeiro. 1923. Dec. 31. Vol. 1. No. 6. pp. 275–277.

According to the latest statistics there are 5,000 lepers in S. Paulo, amongst a population of five million, and the accommodation for them is obviously inadequate, comprising only 34 small leprosaria scattered throughout the State. The writer recommends the construction of four or five more, built on the type of the "Model Leprosarium" of S. Paulo, and the passing of laws for compulsory notification and segregation.

H. Harold Scott.

Caputo (Vincenzo). **La Lepra in Calabria—un caso di lepra tubercolare. Contributo terapeutico.**—*Giorn. Ital. d. Malattie Veneree e d. Pelle.* 1923. Oct. Year 58. Vol. 64. No. 5. pp. 1126–1132. With 1 plate. [27 refs.]

Leprosy in Calabria is probably imported by returning emigrants, chiefly from America. Cases are not numerous. In Cariati (Province of Cosenza) amongst 4,000 inhabitants there have been about 20 since 1890. At the present time there are only two. In Longobucco, in the same Province, with 7,000 inhabitants there is but one case; in Crucoli (Catanzaro) four cases have been reported amongst 3,000 inhabitants. The author gives a detailed account of a severe case, a man aged 48 years, who appears to have contracted the disease from his uncle, a leper, with whom he had been closely associated. Various forms of treatment were adopted between the years 1919–1922, including 138 injections of chaulmoogra oil, 20 of them intravenous, totalling 375 cc. of the preparation. He also had 18 injections of cacodylate of sodium, the maximum dose being 5 cc. There was no appreciable benefit derived from all this, and for 18 months the patient stopped all treatment. He then returned in a much worse condition, and Antileprol (Bayer) was tried. It was given by mouth in capsules containing 0·5 gm., the maximum dose being 5 gm. and the total 125 gm. He also received intramuscular injections, 5 per cent. in cycloform, maximum dose 5 cc., total 150 cc. Improvement was marked, nodules disappeared and the bacilli seen on histological examination of nodules diminished, and the vision also improved. Iridectomy was performed and the patient left with vision 2/10, and he was able to resume his work as a trader.

H. Harold Scott.

ROGERS (Leonard). **The Incubation Period of Leprosy.**—*Indian Med. Gaz.* 1924. Feb. Vol. 59. No. 2. pp. 65–68.

The vexed question of the length of the incubation period of leprosy is dealt with in a scientific manner. The importance of a decision upon this is inestimable, for treatment, if it is to result in cure, must be begun early. The incubation period has been variously stated to be from one year or less to ten years or more, the longer periods being probably due more to latency, or to the overlooking of slight symptoms, especially in the anaesthetic form, than to actual unduly prolonged incubation; but the author here has proceeded from definite facts and shows that the period depends very largely on the mode and length of exposure to infection; in other words, on the dose of the virus and the frequency of its repetition. Under conditions of direct inoculation, incubation may be as short as six months; with close contact, such as sleeping in the same bed as a leper, the average period is twenty months; with less intimate contact, such as would arise amongst those dwelling in the same house, it proves to be a little under three years; lastly, where contact is less close still, mere association, as, for example, where children are allowed to play with an infected child, five years may be regarded as an average. The practical bearing of the investigation is that known contacts should be kept under observation and examined periodically in order to ensure early detection of the disease and timely initiation of treatment.

H. Harold Scott.

MUIR (E.). **Report on Leprosy Research.**—*Ann. Rep. Calcutta School of Trop. Med., Inst. of Hyg. and the Carmichael Hospital for Tropical Diseases for the Year 1923.* pp. 35–37.

Tests are reported of the comparative efficiency of hydnocarpus esters, those made from oils not having the properties of the chaulmoogra group of rotating polarized light, and also those made from coconut oil with little unsaturated fatty acid, such as those prepared from linseed oil, and the conclusion is arrived at that although the linseed has a definite effect in leprosy, the chaulmoogra preparation gave decidedly better results, indicating that the beneficial effects of hydnocarpus and chaulmoorga oils partly depends on the carbon ring group peculiar to this series, and partly to their unsaturated fatty acid as a class. Thymol, as advised by Sumatra workers, has also proved beneficial, but further experience is needed on this point. External applications of trichloracetic acid to the leprous lesions has resulted in rapidly clearing up the lepromata of the skin in many cases. Potassium iodide internally often enables beneficial reactions to be obtained with ethyl esters in comparatively small doses, so injections of 50 per cent. hydnocarpus esters in pure olive oil are advised to contain 10 per cent. of thymol in gradually increasing doses, together with a local application by a glass rod covered with cotton wool of 20 to 30 per cent. of trichloracetic acid in distilled water at intervals of 7 to 14 days.

The most encouraging results are obtained in early cases, and experience shows that leprosy can almost always be diagnosed clinically long before it has become infectious, as shown by negative results of bacteriological examinations in early cases. " We have further found that most early cases lose all signs of active disease within a few months if they remain regularly under treatment and comply with instructions given with regard to sanitation, diet and general habits. The most hopeful method of dealing with leprosy must therefore depend on early diagnosis and early treatment. To carry this out dispensaries are essential, which must be situated within easy reach of the patients and conducted by medical men who are well qualified to diagnose and treat leprosy."

L. R.

MUIR (Ernest). **Leprosy a Self-healing Disease.**—*Lancet.* 1924. Feb. 9. pp. 277–280. With 2 figs. [4 refs.]

The tendency of leprosy to undergo spontaneous recovery, pointed out by HANSEN and others, is due to a very slow and gradual production of immunity to the lepra bacillus, aided by the fact that, unlike tubercle, vital tissues are not affected and death nearly always results from complications. The enormous numbers of lepra bacilli present in nodular cases, without necessarily any great impairment of general health, shows its low toxicity. The course of leprosy shows a curve with few bacilli and low immunity in the first stage, many bacilli with still low immunity in the second stage of rising curve, and a third stage of descent with increasing immunity and resolution and disappearance of the lesions and bacilli, although not until great damage, deformity and crippling have been produced. Both animals and man when in good health show great resistance to infection, a resistance-lowering disease, such as chronic bowel disease, syphilis, etc., often preceding the outbreak of leprous lesions. The leprous lesions also show three stages: firstly, the quiescent phase with multiplying bacilli, but little toxaemia; secondly, the reactionary phase with setting free of toxins and inflammatory reaction in the lesions accompanied by fever, during which the bacilli show granular staining and breaking up, affecting a variable proportion of the lesions; and, thirdly, the stage of resolution with subsidence of the inflammatory reaction and gradual disappearance of the thickening of the tissues and of the lepra bacilli. Different lesions may show the various stages at the same time with spreading in one part and clearing up of another area. During the reactionary stage bacilli as well as toxins may be set free with the formation of small inflammatory nodules, which may quickly disappear again if some immunity has been established.

These stages are of great importance in regard to treatment, as in the first stage of low immunity any depressing conditions should first be removed; antigens, such as possibly defatted acid-fast bacilli, to increase the immunity, and the fatty acids of hydnocarpus and chaulmoogra oils are of value, combined with counter-irritation by infiltrating the ethyl esters into the subcutaneous tissues under the skin or nerve lesions or by the external application of a 1 in 3 solution of trichloracetic acid in distilled water painted on every six to ten days. In the second stage the same remedies should be used, especially the esters of the fatty acids, with special caution to avoid inducing severe reactions, while trichloracetic acid is now of great value. In the third stage with a fair degree of immunity all the above remedies may be pressed, as considerable reactions are generally followed by marked improvement, and there is far less danger of an increase of the disease than in the second stage, large injections of the esters of the fatty acids being given, and if sufficient reaction is not induced iodide of potassium should be given internally, beginning with half a grain daily, and increasing until reactions are induced or the patient's tolerance is reached.

The prognosis is improved by the fact that leprosy tends to be a self-healing disease, and when the third stage is reached there is little chance of recurrence, and if negative bacteriological examinations have been obtained over a period of two years in this stage, the leper may be considered cured, but a similar condition during the first and second stages should be considered one of relative cure, and any condition lowering the general resistance may be dangerous. Experience is required in recognizing the different stages, which are not clear cut, but any case advanced to the borderland of the third stage may be treated as one in that stage. The object of treatment is to cut short the disease in the first or second stages and to hasten resolution in the third by causing moderate reactions.

L. R.

i. IMPEY (S. P.). **Leprosy.** [Correspondence.]—*S. African Med. Rec.* 1924. Feb. 9. Vol. 22. No. 3. pp. 63–64.

ii. KIDD (Leonard J.) & iii. SHAW-MACKENZIE (J. A.). **Leprosy: a Self-Healing Disease.** [Correspondence.]—*Lancet.* 1924. Mar. 1. p. 464, and Mar. 8, pp. 517–518.

i. Impey writes, in reference to MUIR'S paper on Leprosy: A Self-healing Disease, to point out that as early as 1894 he drew attention, in an essay published by the New Sydenham Society*, to the frequency with which leprosy infection dies out, especially in the nerve form, rendering the leper no longer infective or in need of segregation.

ii. Kidd mentions having been shown by Dr. KAURIN in Norway in 1891 a healthy girl who had recovered from leprosy spontaneously.

iii. Shaw-Mackenzie writes once more to draw attention to his former paper [see this *Bulletin*, Vol. 18, p. 391], pointing out that sodium chaulmoograte, morrhuate and oleate stimulate the fat-splitting action of lipase, and may account for the effects of these substances on the bacilli of leprosy and tuberculosis. [See *Brit. Med. Jour.* July 7, 1923 for a paper by ROGERS on this point and in which Dr. Shaw-Mackenzie's work is referred to.]

L. R.

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* IMPEY (S. P.) On Spontaneous Recovery from Leprosy.—*New Sydenham Society.* Vol. 157. 1895. pp. 209-226.

Monrad-Krohn (G. H.). **The Neurological Aspect of Leprosy ("Spedalskhed")** (Vid.-Selsk. Skr. 1.M.-N.Kl. 1923. No. 16.) —78 pp. With 39 text figs. 1923. Christiania: On Commission by Jacob Dybwad.

This valuable monograph gives a lucid and well-illustrated account of the nerve form of leprosy based on minute examinations of 63 Norwegian cases and a knowledge of the literature of the subject. The pathological anatomy of the nervous system in leprosy is first briefly reviewed, and emphasis laid on the lesions being essentially due to an ascending neuritis due to lepra bacilli in the peripheral parts of the nerves, while in advanced cases the spinal ganglia and the posterior columns of the spinal cord may show secondary degenerative changes.

Of the cranial nerves the sensory portion of the fifth and the seventh are most affected, the different qualities of sensation being equally diminished as a rule, the frontal and supraorbital nerves sometimes showing visible thickening. The facial nerve frequently shows a characteristic involvement of its peripheral portion, especially the muscles of the upper part of the face, producing ectropion of the eyes, usually bilateral, and of the supraoral muscles with dribbling of saliva and difficulty in pronouncing labials, while lagophthalmus is very common; facial paresis or paralysis has been found in 69·5 per cent. of his cases, while a portion only of the face muscles fail to respond to the faradic current. The other cranial nerves are rarely affected.

Motor disturbances begin in the distal parts of the limbs and spread slowly to the more proximal parts, being essentially due to a peripheral neuritis, producing the claw and the simian hand, but not extending above the forearms, and corresponding parts of the lower extremities. Coordination is seldom affected and never to any great degree.

Sensory disturbances begin with hyperaesthesia, neuralgia often bringing the patient to the doctor, and go on to hypaesthesia. Here again the different qualities of superficial sensation are as a rule affected to approximately the same extent, for although all kinds of dissociations are met with they are never complete. In maculo-anaesthetic leprosy the anaesthesia corresponds more or less to the areas of the macules, but are more pronounced on those of the limbs than on the trunk. A number of charts of the distribution of the loss of the sensations of touch, pain and heat and cold are given. On the other hand, deep sensation and joint sense are well preserved. Thickening of the nerves was most frequently found in the following order, ulnar, great auricular, tibial behind the internal maleolus, supraorbital, peroneal according to Laehr. The deep reflexes are little affected; vasomotor disturbances appear as coldness and cyanosis of the hands and feet; anidrosis is frequent in the anaesthetic areas and can be brought out by pilocarpine, glossy skin, pigmentations and depigmentations, pemphigus, loss of hair, perforating ulcers, dry necrosis and concentric atrophy of the bones of the fingers and toes are the result of secretory and trophic disturbances, but the nails are often preserved in spite of atrophy of the small bones. Mental changes chiefly occur as depression or persecutory delusions.

The diagnosis of nerve leprosy is commonly helped by the presence of skin lesions, but may be difficult in their absence, and depends mainly on the presence of an ascending polyneuritis, the presence of partial facial paralysis already described, thickening of nerve trunks and the absence of incoordination and other spinal cord symptoms, which serve to differentiate it from syringomyelia, progressive muscular atrophy, amyotrophic lateral sclerosis and other diseases of the cerebro-spinal axis, which may in some respects resemble it.

L. R.

UNNA Jr. (Paul). **Beitrag zur Frage der tuberkuloiden Lepra.**—*Virchows Arch. f. Path. Anat. u. Physiol.* 1923. Vol. 246. pp. 253–261. With 1 fig. [29 refs.]

After describing in detail a case of nodular leprosy with a few anaesthetic patches, some theoretical matters are considered regarding the pathological differences between the tubercles of leprosy and of tuberculosis, and the author concludes that the reaction is in proportion to the number of the bacilli and that different stages of the disease are met with in the same subject. He obtained negative results in experiments on monkeys, and refers to KYRLE's work, in which he inoculated monkeys with leprosy nodules and made sections of portions of the skin removed at intervals of 35 days and found in the first piece proliferation of the epithelioid cells and the formation of lepra-vacuolated large cells containing numerous acid-fast elements ; in the later section there were small nodules of epithelioid cells, very few giant cells and no acid-fast bacilli, but very numerous small round cells resembling nodules of tuberculosis, the lepra bacilli having now been destroyed owing to the resistance of monkeys to the infection, from which they recover.*

L. R.

GOMES (Emilio). **Sobre a transmissão da lepra pelos mosquitos.**—*Brazil-Medico.* 1923. Dec. 29. Year 37. Vol. 2. No. 26. pp. 379–381.

A brief review, mainly historical, of the transmissibility of leprosy by insects. The author concludes that the mosquito is the sole transmitter on the grounds that : 1. Cases are met with in which no contact can be traced ; 2. Leprosy occurs only in countries where there are mosquitoes ; 3. Rigorous disinfection and isolation will not prevent healthy subjects in the vicinity from becoming leprous unless anti-mosquito measures are also taken in hand.

H. Harold Scott.

HENRY. **Note sur un case de lèpre.**—*Rev. Méd. et Hyg. Trop.* 1924. Jan. Vol. 16. No. 1. pp. 26–27.

The interest of this case is that it commenced in a child aged three years, who had been separated from his leper parents two months after birth, his grandparents also having been lepers. The first sign was a red patch on one thigh noticed in November 1922, which in January had become larger and now showed anaesthesia, and two further patches had appeared on the limbs. The exposure to infection was therefore only two months and the incubation period three years.

L. R.

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* *Frankfurter Zeitschr. f. Pathologie.* 1916. Vol. 19. heft 1/2.

Muir (E.). **Nerve Abscess in Leprosy.**—*Indian Med. Gaz.* 1924. Feb. Vol. 59. No. 2. pp. 87–89. With 2 figs.

The writer has met with two cases of abscesses forming within the greatly thickened nerves of leprosy, and he gives illustrations of such a case affecting the medial cutaneous nerve just above the elbow, and forming a tumour the size of a pigeon's egg, which was found on incision to contain yellow pus free from organisms demonstrable microscopically or by injection into guineapigs. A little higher up in the nerve was another small cavity connected with the first one, while there was typical anaesthesia and alteration in the colour of the skin in the distribution of the nerve, leaving no doubt regarding the diagnosis. He has seen another similar case with four nodes on the ulnar nerve, the lowest of which was found to contain pus. He is not aware of any similar record.

L. R.

Travers (E. A. O.). **The Treatment of Leprosy at the Leper Asylum, Kuala Lumpur, Selangor.**—*Fifth Congress of the Far Eastern Association of Tropical Medicine,* Singapore, September, 1923.

The ethyl esters prepared from *Hydnocarpus wightiana* oil in Muir's E.C.C.O. mixture was used in 37 cases, of which 27 had been treated for the full twelve months, all being bacteriologically positive nodular or mixed cases. Of these 10 had improved, 11 not improved and 6 were worse, the number of injections having varied from 20 to over 50. In most the improvement was slight, although in one case of only three months' duration it was very great, but, on the whole, the results were disappointing, and women and children object to the pain of the injections.

On the other hand, the writer noticed remarkable improvement in several lepers who treated themselves with a Chinese preparation of chaulmoogra nut combined with two other drugs, nine cases being tabulated, of which five were found to be negative bacteriologically by Dr. Stanton. The preparation was found to consist of 2 parts of chaulmoogra nut (*Taraktogenus kurzii*), 1 part of hemp seed steamed and dried and ground as fine as possible, and 1 part a Chinese seed (Pak Chut Lai). Only well preserved nuts should be used, and not rancid ones, to avoid stomach trouble, and the writer suggests that in extracting the oil some important substance in the nut may be left behind. Since April 4th, 1923, some eighty lepers have been treated by this preparation, given orally in doses beginning with 15 grains twice daily and increased to 30 grains twice a day without severe gastric trouble. The treatment is popular, women and children taking it readily, while the cost is low, only thirty dollars a month for eighty cases, and a large number of cases have shown healthy reaction and decided improvement. In ulcerated cases 0·5 to 1 grain of tartar emetic intravenously resulted in complete healing of the ulcers in 13 cases, improvement in 8 and no effect in 10 cases, but no benefit was produced in unulcerated lesions. Most asylum cases are too advanced on admission to allow of much hope of recovery, so the public should be educated to recognise the early signs of the disease, and the paper concludes with the following hopeful statement : " When it is generally understood that, if taken in time, the progress of the disease can be arrested and that in a large proportion of cases leprosy can actually be cured, there is no doubt that the lepers will come for treatment directly they realize that they are afflicted with the disease. The importance of this cannot be too greatly emphasized, and I am convinced that when we are in a position to treat leprosy from an early stage we shall be able definitely to cure the disease."

L. R.

ROBINEAU (Marcel). **Le traitement de la lèpre dans les leproseries d'Ebolowa, Yedjang, Ngalan.**—*Congrès de la Santé Publique et de la Prévoyance Sociale, Marseille, 11–17 Septembre, 1922. Comptes Rendus.* pp. 142–154.

This paper deals with work already reviewed (see Vol. 20, p. 822, of this *Bulletin*), but gives some further details regarding the results obtained by the use of aiouni and eucalyptol, chaulmoogra oil, and of atoxyl and arrhenal consecutively, all intramuscularly, in a series of cases. In 30·9 per cent. of 42 macular cases complete disappearance of the disease was obtained, but in 35 maculo-atrophic cases only retrogression of the symptoms was got in 29 cases. Of the 13 recovering cases 11 were females.

L. R.

MAPLES (E. E.). **Treatment of Leprosy.**—*Nigeria Ann. Med. & San. Rep. for the Year 1922.* pp. 31–32.

The results of treatment at the Native Hospital, Calabar, are recorded, sodium gynocardate having been used intravenously, but no definite conclusion has been arrived at, " although the cases seem to be improving, and declare that they feel much better generally." One early nodular case treated by this and other methods for four years has been bacteriologically clear and free from all symptoms for two years and " to all intents and purposes he appears to be cured."

On page 51 it is reported regarding leprosy that " The long contemplated movement against this widespread indigenous infection has not yet been materialised and there is little immediate prospect of any change."

L. R.

PARRA (Ricardo F.) & SANTOS (Jorge E.). **Un año de tratamiento de la lepra por los esteres etílicos de los ácidos grasos del aceite de chaulmugra en Agua de Dios. (Colombia.)**—*Repert. de Med. y Cirug.* Bogotá. 1923. Dec. Vol. 15. No. 3. (No. 171). pp. 124–137.

This paper, with its appended tables, constitutes the report on the first year's employment of the ethyl esters of unsaturated fatty acids of chaulmoogra in the treatment of leprosy in Agua de Dios (Colombia). 700 patients have been under observation and treatment. The doses given varied from 1 to 15 cc., but experience has shown that 6 cc. is the maximum well tolerated in weekly injections. With larger doses untoward symptoms appeared, in particular dyspnoea, cough, laryngeal spasm and burning pain in the chest. Many patients have shown marked improvement both in their general state and in the local manifestations. The bacilli in the latter became fewer in number and fragmented. The authors find this preparation far more satisfactory than the oil itself or any of the derivatives hitherto tried. In the tables brief notes are given of 125 patients treated in different district hospitals, but, as the authors state, it is too early yet to expect very definite results.

H. Harold Scott.

i. Schöbl (Otto). **Chemotherapeutic Experiments with Chaulmoogra and Allied Preparations.**—*Philippine Jl. Sci.* 1923. Dec. Vol. 23. No. 6. pp. 533–542. [4 refs.]

ii. ——. **Chemotherapeutic Experiments with Chaulmoogra and Allied Preparations. II. Comparison of the Antiseptic Power of Chaulmoogra Oil with that of Other Vegetable and Animal Oils, Rare and Common.**—*Ibid.* 1924. Jan. Vol. 24. No. 1. pp. 23–27. [1 ref.]

i. This paper affords important confirmation and extension of the work of Walker and Sweeney on the action of chaulmoogra soaps on acid-fast bacilli in vitro in fluid media. Measured amounts of the oils were added to 10 cc. of 5 per cent. glycerine agar, which was then inoculated with a human tubercle bacillus, and the tubes were compared with control tubes after various periods of time to note any inhibition of growth, liquid paraffin and olive oil being added to other tubes for comparison. The tables show a specific action of the chaulmoogra oil of considerable degree, although less than Walker claimed, while non-acid-fast bacilli were not inhibited by fifty times the amount of chaulmoogra oil that served to completely inhibit the growth of the tubercle bacillus. On comparing the effects of different oils of the chaulmoogra and allied species that of *Hydnocarpus wightiana* gave the greatest inhibitory power, *Taraktogenus kurzii* and *H. alcalae* came next, while *Gynocardia odorata* had no effect, not containing any of the chaulmoogric fatty acid series. Further, a sodium salt prepared from isolated hydnocarpic acid approaches in strength a soap of the total fatty acids, while the sodium salt of chaulmoogric acid is far below the soap of hydnocarpic acids in growth-inhibiting effect, as previously found by Walker.

ii. The inhibitory effect of a large number of oils on the growth of tubercle bacilli on solid media is here dealt with, in a similar manner to the tests of chaulmoogra oils in the preceding paper, in concentrations not exceeding 0·5 per cent. of the culture medium. No less than forty-two oils, including vegetable, essential and animal oils, mostly found in the tropics, were investigated, and the results are arranged in a table to indicate the amount of oil added to 10 cc. of agar which produced inhibition of the culture. Three groups stand out, firstly the oils which inhibit acid-fast bacteria in comparatively small doses, with or without acting on non-acid-fast bacteria. The figures given as growth-inhibiting value express the relative strength of the inhibitory effect, 1 per cent. concentration being taken as a unit.

Of the chaulmoogra group *Hydnocarpus wightiana* showed the highest effect with a value of 100, 0·001 being the titre, against a value of 20 and a titre of 0·005 of *Taraktogenus kurzii* and *H. venenata, subfalcata* and *alcalae.* Of other oils *Cinnamomum zeylanicum* showed the remarkable result of being equal to *H. wightiana* against acid-fast bacilli and also against non-acid-fast bacteria, while the next highest effect against acid-fast bacilli only was shown by cashew nut oil [which was used externally in leprosy in South America several decades ago], namely a value of 10 and titre of 0·01, and the same results were got with vitiveria (*Andropogon zezanioides*), dacrydium and bergamot oils. Thus, although only the chaulmoogra group show high values against acid-fast bacilli, several other oils have an appreciable action on them.

L. R.

READ (B. E.). **A Chemical Study of the Comparative Values of the Ethyl Esters of Chaulmoogra and Hydnocarpus Oils.**—*China Med. Jl.* 1924. Jan. Vol. 38. No. 1. pp. 25–34. With 1 fig. [7 refs.]

This paper also deals with the comparative value of chaulmoogra and hydnocarpus oils investigated at the Peking Union Medical College. After a brief account of the advances of the last few years, it is pointed out that the Chinese variety of chaulmoogra oil is derived from *Hydnocarpus anthelminthica*, or Ta Feng Tzu, which is said to have been imported from Siam as early as 1590, is cheap and plentiful all over China, and can be supplied by Dr. McKEAN, of Chien Mai, Siam, in large quantities. It is essential to obtain unadulterated oils, and that obtained by cold expression, which remains liquid at ordinary temperatures, is better than hot drawn oil. Chinese samples are often adulterated to the extent of 50 per cent., probably with soy bean oil. Taraktogenus and Hydnocarpus oils are regarded as of equal value, and also that of *H. anthelminthica*, known as lukrabo oil, 120 lb. of the seeds of which yielded 33·15 lb. of kernels, from which 7·4 lb. of oil was got by moderate pressure, the cost of the oil without labour coming to from 1 to 1·5 dollars. DEAN's method of preparing ethyl esters is next described, 10 lb. of the expressed oil yielding 4 litres of ethyl esters, which is about 17 per cent. more than is obtained from chaulmoogra oil. The molecular structure of the acids is next discussed, POWER's early work being quoted, and it is concluded that a low iodine value, other factors being good, indicates a greater percentage of chaulmoogric acid and activity. Pure ethyl esters give little or no pain on injection, the hydnocarpus esters being entirely painless. The suggestion is made that one part of the soap of chaulmoogric fatty acids incorporated in 5 to 10 parts of ordinary toilet soap would make a satisfactory toilet soap for the use of lepers, and that the ethyl esters prepared from *H. anthelminthica* are superior to those of chaulmoogra oil, while the low price of this common Chinese oil should make it of service to the medical profession in China.

L. R.

PERKINS (Granville A.) & CRUZ (Aurelio O.). **A Comparative Analytical Study of Various Oils in the Chaulmoogra Group.**—*Philippine Jl. Sci.* 1923. Dec. Vol. 23. No. 6. pp. 543–571. With 1 plate. [9 refs.]

This is an important but highly technical contribution to our knowledge of the composition of chaulmoogra, hydnocarpus and other closely allied oils, bringing out some practical points, and based on work in the chemical laboratory of the Culion Leper Colony. Both commercial samples of the oils and, where possible, the actual seeds from which the oils are extracted were obtained, including those of true chaulmoogra oil of the British Pharmacopoeia. *Taraktogenus kurzii*, seven varieties of Hydnocarpus, the most important of which are the Indian *Hydnocarpus wightiana* and the Chinese *H. anthelminthica*, which are very closely allied both botanically and in their chemical composition to true chaulmoogra oil, together with the oils of *Pangium edule*, which was incorrectly said by BRILL to contain the chaulmoogra series of fatty acids, were examined, and lastly *Gynocardia odorata*, which was confused for long with true chaulmoogra oil, although it also does not contain that series of fatty acids, these last two therefore being unlikely to be of much value in leprosy treatment. Three of the other Hydnocarpus varieties are found in small limited areas of the Philippines and are not available in commercial quantities. A table is first given of the previously recorded chemical data on this subject; a brief description of the trees furnishing the oils follows, with the methods of extracting the oils, and the amounts obtained from the various seeds are tabulated, which in the case of the first grade oils from well preserved seeds varied from 8 to 38 per cent., but was much lower, 2 to 19 per cent., in second grade oils of a very dark colour from seeds which had not been properly dried and had consequently become rancid; a change which is especially common in that of *Taraktogenus kurzii*, while on the contrary the kernels of the seeds of *Hydnocarpus wightiana* retain a fresh odour, taste, and appearance for many months if kept fairly dry. [The latter are therefore likely to be of especial value orally in the nut form, without extracting the oil, as recently advocated in the case of *Taraktogenus kurzii* by E. A. O. TRAVERS in the Kuala Lumpur Leper Asylum (see above), and the seed can be obtained at a very low rate, about three shillings for 80 lb., from the Ernakalum Trading Co., Cochin, S. India.] Mouldy seeds, however, have a very low yield of oil. Optical rotation is the most characteristic property of the chaulmoogra group (including Hydnocarpus varieties), being as high as 45° to 50° against 2·8° to 16·9° in *Pangium edule* and nil in *Gynocardia odorata*. *Hydnocarpus* varieties, especially *wightiana*, give higher readings than Taraktogenus, so are probably slightly superior for medicinal use, although this can only be decided clinically. The iodine value, acidity, and freezing point of the fatty acids vary only slightly in the different oils, while determinations of the specific rotatory powers of the fatty acids indicated that the variations of optical rotation in the different oils is really due to differences in the composition of the fatty acid fraction, and not to any other constituent.

Fraction of the ethyl esters of several oils, to effect a partial separation of the mixed fatty acids, is next described and the properties of the higher and lower melting point acids are tabulated and their characters described. Very little difference was noticed between those of *Taraktogenus kurzii* and of *Hydnocarpus wightiana*, the two most commonly used oils in treatment, but the hydnocarpic acid fraction was definitely lower in the Chinese variety, *H. anthelminthica*, whose specific rotatory power is also low. The only hydnocarpus oil which differed much from the rest was *H. alcalae*, which contains a very large amount of chaulmoogric and little or no hydnocarpic acid, so is likely to be inferior in treatment, while the conclusion is come to that there is no reason for regarding Hydnocarpus oils in general as inferior therapeutically to true Chaulmoogra oil. The latter is more expensive and difficult to get and also more liable to deteriorate than that of *Hydnocarpus wightiana*.

L. R.

STEVENEL. **Note préliminaire sur la découverte d'un principe actif dans l'huile de Chaulmoogra.**—*Bull. Soc. Path. Exot.* 1924. Jan. 9. Vol. 17. No. 1. p. 108.

In a preliminary note the writer claims to have discovered the active principle of chaulmoogra oil in the form of an unstable alkaloid, which kills lizards with symptoms like those of curare, but is less toxic to warm blooded animals such as rats. He thinks it may be the cause of giddiness after taking the oil, and that the principle is combined with the fatty acids.

L. R.

SAMSON (José G.) & LIMKAKO (Gabino). **Preliminary Report on Creosote as an Adjuvant in Leprosy Treatment.**—*Philippine Jl. Sci.* 1923. Nov. Vol. 23. No. 5. pp. 515–527. With 2 text figs. [1 ref.]

MUIR uses creosote in combination with ethyl ester hydnocarpate in leprosy as an antiseptic, while its value in tuberculosis makes it possible that creosote may also have some direct action in leprosy. The writers have carried out careful tests to ascertain if this addition has such direct value, 194 patients being divided into four closely similar groups and given the following treatment :—

Group I.—53 cases, ethyl ester chaulmoograte intramuscularly.

Group II.—49 cases, ethyl ester chaulmoograte intramuscularly and creosote orally.

Group III.—43 cases, ethyl ester chaulmoograte intramuscularly, creosote and camphor (Muir's E.C.C.O. mixture).

Group IV.—49 cases, ethyl ester chaulmoograte intramuscularly and creosote, but no camphor.

Group II received 0·3 gram. of creosote in pill at each injection of E.E. chaulmoograte, the injections in all the groups being given twice a week. Group III had injections of a mixture of E.E. chaulmoograte 100 cc., creosote 25 cc., and camphor 25 grams. In group IV no camphor was used, but 12·5 cc. of creosote to 100 cc. of the ethyl esters were injected. The dose was increased by 1 cc. at a time up to the amount which could be tolerated without untoward local or general effects, and the relative amount of irritation to the tissues produced is shown by the fact that the average dose of the first two groups with the injection of ethyl esters alone was 3·8 and 3·7 cc., and of the last two groups only 3·1 and 3·2 cc. It was found that the addition of camphor lessened the irritant effect of the creosote, as while in Group III 20 per cent. of each could be used, in Group IV 20 per cent. of creosote alone was too irritating to be borne and the amount had to be reduced to approximately 11 per cent. The percentage of reactions was 4·3 and 5·9 per cent. in groups I and II, and 6·6 and 8·4 per cent. in groups III and IV, while the percentage of cases reacting were 54·7, 63·1, 76·7 and 73·5 respectively in the four groups, the reactions also having been more severe in the last two groups, which accounts for the smaller average doses tolerated by them, while in the first few creosote injections slight fever was noted, but not with later ones. On the other hand, the reactions produced by the creosoted preparations were milder than with the plain preparations, while they produced practically no exacerbations of the old lesions.

At the end of six months the results obtained were carefully worked out and classed as improved, stationary or worse, and showed distinctly greater (61 per cent.) improvement in the creosoted than in the plain preparations (51 per cent.). Group I showed only 43 per cent. improved and 8 per cent. worse, group II gave 59 per cent. improved and only 2 per cent. worse, Group III 58 per cent. improved but 14 per cent. worse, and group IV 71 per cent. improved and only 4 per cent. worse. The creosote groups gave the best results, while the addition of camphor appeared to do some harm, with the largest proportion of cases worse. Creosote was also found to stimulate the appetite, with increase in weight as well as in the improvement rate.

L. R.

RODRIGUEZ (José) & EUBANAS (Froilan). **Treatment of Leprosy with Antimony.**—*Philippine Jl. Sci.* 1923. Dec. Vol. 23. No. 6. pp. 575–594. [11 refs.], and *Monthly Bull. Philippine Health Service.* 1923. Mar. Vol. 3. No. 3. pp. 104–106. [5 refs.]

At the request of Dr. CAWSTON the writers have tried antimony in leprosy cases, as it had been reported by him to have given remarkable results in rapidly relieving paralysis, drying up ulcers and producing general improvement. Thirty advanced hospital cases were treated for six months with tartar emetic intravenously and twenty-two received antimony wine orally, and another twelve a modified Castellani yaws mixture for three months, the average duration of the disease being eleven years. Only an average of 0·0015 gram of tartar emetic a week intravenously or 0·252 gram. of vinum antimonale was borne, and no improvement was noticed in any group, the general condition on the whole being unfavourably affected, while six of the intravenous group and one other case died. In 25 per cent. of the survivors the ulcers improved as well as in 42 per cent. on the Castellani mixture, mostly in ulcers of nodules of short duration. In the intravenous group an outstanding feature was injury to the kidneys, and in the other group lepra fever. The low tolerance to the intravenous method in lepers is striking as compared with such diseases as kala azar, and is attributed to the great strain on the kidneys in advanced lepers with extensive skin disease and loss of sweating power. Some cases with complicating pulmonary tuberculosis appeared to be injuriously affected by the antimony treatment. They were, thus, quite unable to confirm the good results claimed by CAWSTON and supported by WILDISH, and although they were not able to try the proprietary preparation oscol stibium, they see no reason to think it is likely to prove more effective.

L. R.

MACKAY (James G.). **The Antimony and Sulphur Treatment in Leprosy.** [Correspondence.]—*S. African Med. Rec.* 1924. Apr. 12. Vol. 22. No. 7. p. 159.

Although the writer has "everything to say in favour of the ethyl esters of chaulmoogra oil," he thinks there is sufficient evidence to warrant the further and more wholesale use of antimony with sulphur as introduced by CAWSTON, so that this South African expert may be helped, and all the glory of the improved treatment not left to India. He records no personal experience of the method.

L. R.

HERXHEIMER (Gotthold). **Ueber die Leprazellen.**—*Virchows Arch. f. Path. Anat. u. Physiol.* 1923. Vol. 245. pp. 403–447. With 6 figs.

This is a very lengthy description of the anatomical and microscopical changes found in a case of nodular leprosy, with numerous references to the older literature. Naked-eye lesions were found only in the skin and naso-pharyngeal mucous membrane, not in the internal organs, where microscopically a few acid-fast bacilli were detected in the liver, spleen, and in the glands. Sections of the skin showed unchanged epithelial cells, and no excess of pigment. The cutis showed extensive leprotic infiltration with typical large cells containing numerous bacilli, and staining with scarlet-red solution shows up clearly the lepra cells and demonstrates the characteristic lipoid material in them, as is illustrated by coloured drawings. Endothelial cells of small capillaries showed many separate bacilli, while in the large vacuolated cells masses of bacilli were found at the edges of the vacuoles ; some of the organisms have degenerated and broken up into small red granules. The vacuolated cells with degenerated bacilli are not found in the internal organs. The bacilli can therefore more or less exist in all the cells of all parts of the body and increase undisturbed and with very little damage to the cells, but in these they are never found in large globular masses, but always as scattered well-developed rods of a saphrophytic nature in vessel or gland endothelium, which may be swollen, but are otherwise unaltered, and never show the vacuolation which is so typical of the large lepra cells of the skin lesions. These are derived from the reticulo-endothelial cells of the cutis, which alone show degenerative changes with vacuolation and massed bacilli, some undergoing degeneration. Thus these cells disintegrate the bacilli, but are themselves destroyed in the process with the formation of lipoid substance, whether derived from the capsules of the bacilli or not being doubtful.

References are next made to recent literature on the action of chaulmoogra oil and its derivatives, and the suggestion is made that previous treatment with this oil may account for the lipoid material found in the lepra cells. Lastly, the literature of animal experiments is dealt with, and stress is laid on the value of the findings of Kyrle in monkeys inoculated with masses of lepra bacilli in nodules, in some of which the tissues excised and examined showed vacuolated lepra cells containing masses of bacilli, some undergoing disintegration, as in skin lesions of human leprosy, indicating positive results of the experiment.

L. R.

Limousin (Henri). **Inoculation de la lèpre au lapin.**—*C.R. Acad. Sci.* 1924. Feb. 4. Vol. 178. No. 6. pp. 599–600.

A rabbit was inoculated with human lepra bacilli (from the nose of a leper) into the anterior chamber of the eye, with only temporary local reaction, but when killed after 22 months several nodules containing acid-fast bacilli were found in the lungs only.

L. R.

Mazza (Salvador). **Phagocytose des bacilles de Stefansky dans le péritoine des rats et des cobayes.**—*Bull. Soc. Path. Exot.* 1924. Mar. 12. Vol. 17. No. 3. pp. 208–211. [3 refs.]

Metchnikoff showed that Koch's tubercle bacillus in animals is first phagocyted by polynuclear leucocytes, which in their turn become included in mononuclears uniting to form giant cells as shown by Borrel. The writer has found the same procedure to follow the intraperitoneal injection of Stefansky's rat-leprosy bacillus in animals within about eight hours, during which the polynuclears show degenerative processes.

L. R.

i. MORISSEAU. **Le dépistage de la lèpre au début.**—*Rev. Méd. et Hyg. Trop.* 1924. Jan. Vol. 16. No. 1. pp. 24–26.

ii. DOUGLAS (A. R. J.). **Control of Leprosy.** [Correspondence.]—*Brit. Med. Jl.* 1924. Mar. 8. p. 446.

iii. PRINGAULT (E.) & VIGNE (P.). **Les traitements recents de la lèpre.**—*Congrès de la Santé Publique et de la Prévoyance Sociale, Marseille, 11–17 Septembre,* 1922. *Comptes Rendus.* pp. 130–136. [26 refs.]

iv. HAMZAH (Moehamad). **The Results of treating Leprosy with Thymol.**—*Trans. Roy. Soc. Trop. Med. & Hyg.*, 1923, Dec. 13. & 1924, Jan. 17. Vol. 17. Nos. 6 & 7. pp. 386–391.

i. The Negroes of the Upper Volta region, West Africa, who readily recognize the early signs of leprosy, look for discoloured patches on the body, pains on pressure over the distal phalanges, and a nodule in the testicle, and in choosing captives they avoid any showing these signs.

ii. A letter from Burma advocating segregation as of more importance than treatment in the control of leprosy. [It is not explained how the 100,000 census-returned Indian lepers, or the million believed by MUIR to be the true number, can be segregated, with the financial and administrative resources available.]

iii. This is a brief review of some of the recent literature regarding the treatment of leprosy, with a number of references, but no new material.

iv. This paper refers to the same work as a communication by the same author previously dealt with in this *Bulletin.* [Vol. 21, p. 182.]

L. R.

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